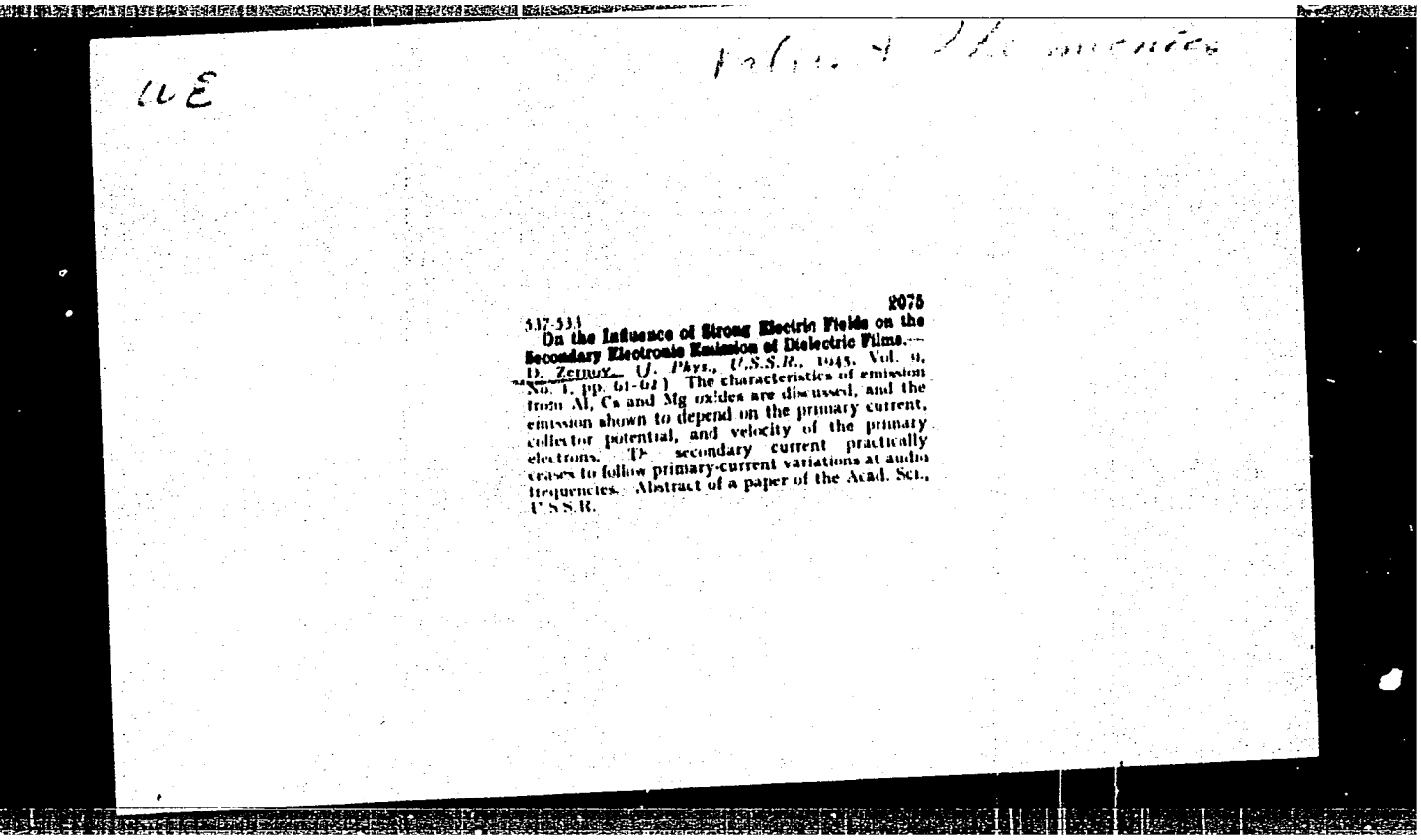

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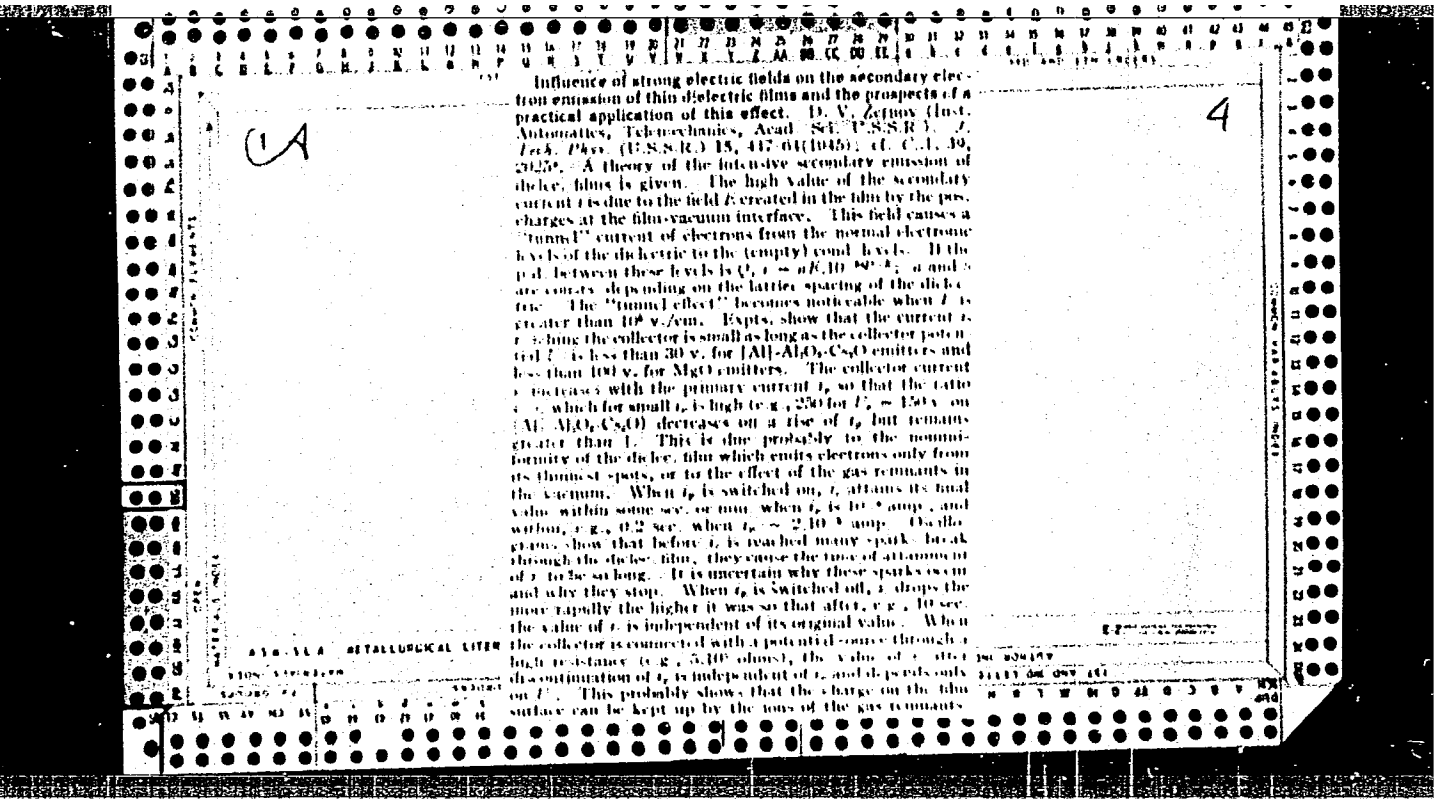
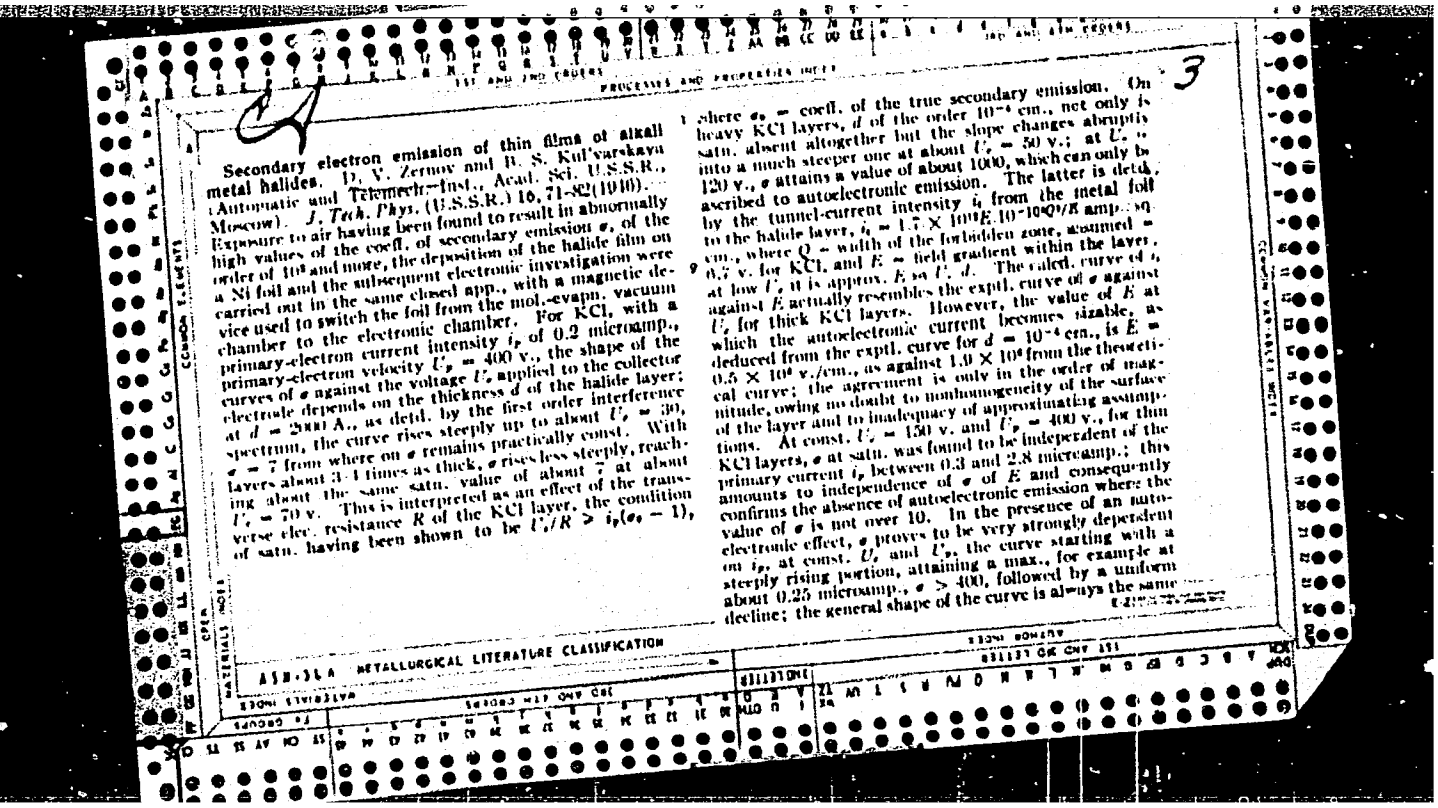
537-533

On the Influence of Strong Electric Fields on the Secondary Electronic Emission of Dielectric Films.— D. Zernov. (*J. Phys., U.S.S.R.*, 1945, Vol. 9, No. 1, pp. 61-62.) The characteristics of emission from Al, Cs and Mg oxides are discussed, and the emission shown to depend on the primary current, collector potential, and velocity of the primary electrons. The secondary current practically ceases to follow primary-current variations at audio frequencies. Abstract of a paper of the Acad. Sci., U.S.S.R.



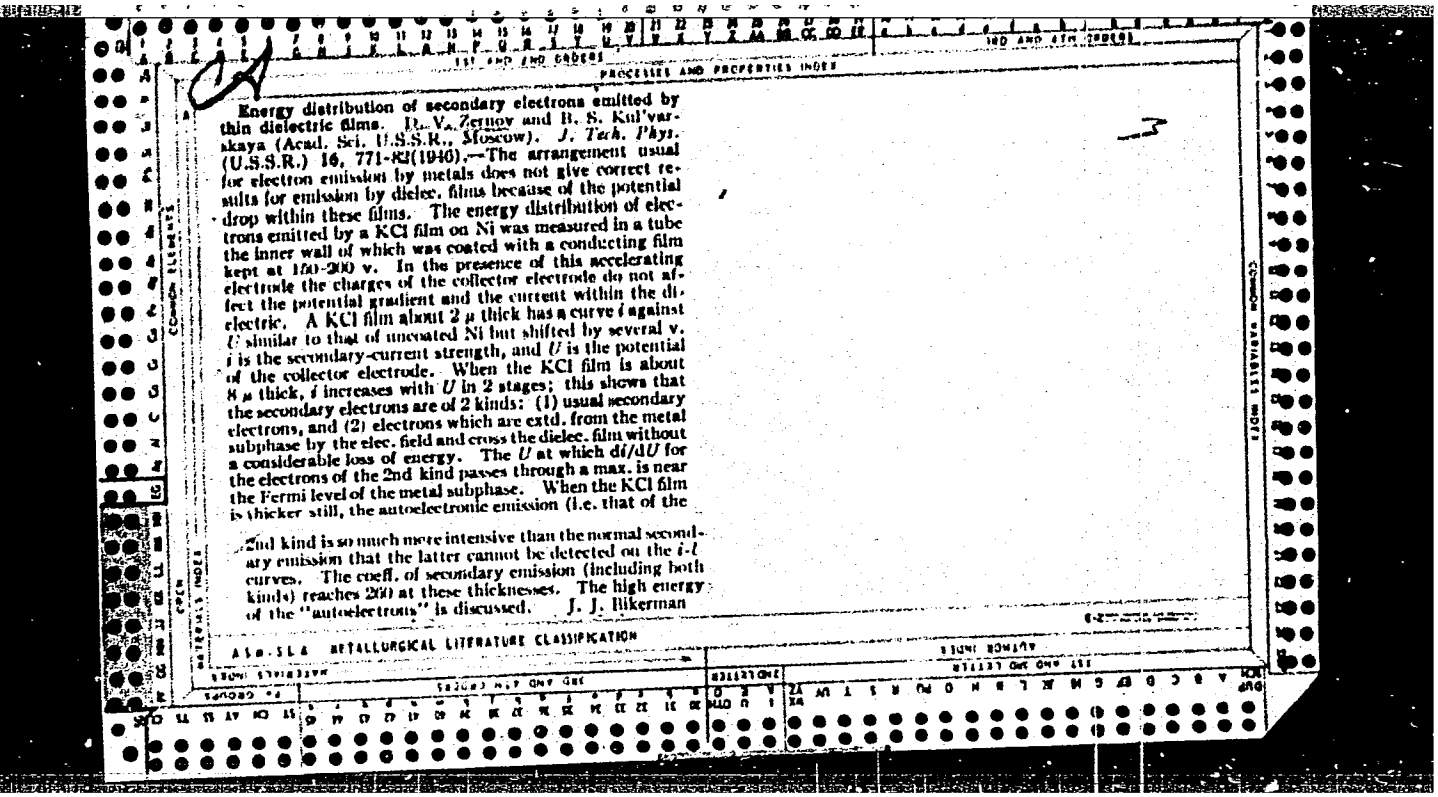
Influence of strong electric fields on the secondary electron emission of thin dielectric films and the prospects of a practical application of this effect. D. V. Zernov (Inst. Automatics, Telemechanics, Acad. Sci. U.S.S.R.). *J. Tech. Phys.* (U.S.S.R.) 15, 417–61(1945); cf. C.A. 39, 2025⁸. A theory of the intensive secondary emission of dielec. films is given. The high value of the secondary current i_2 is due to the field E created in the film by the pos. charges at the film-vacuum interface. This field causes a "tunnel" current of electrons from the normal electronic levels of the dielectric to the (empty) cond. levels. If the potential between these levels is U, $i_2 = aE/U \cdot e^{-b/E}$; a and b are constants depending on the lattice spacing of the dielectric. The "tunnel effect" becomes noticeable when E is greater than 10^6 v./cm. Expts. show that the current i_2 reaching the collector is small as long as the collector potential U_c is less than 30 v. for [Al]-Al_2O_3-Cs_2O emitters and less than 100 v. for Mg(O) emitters. The collector current i_2 increases with the primary current i_1, so that the ratio i_2/i_1, which for small i_1 is high (e.g., 250 for $U_c = 150$ v. on Al-Al_2O_3-Cs_2O) decreases on a rise of i_1 but remains greater than 1. This is due probably to the nonuniformity of the dielec. film which emits electrons only from its thinnest spots, or to the effect of the gas remnants in the vacuum. When i_1 is switched on, i_2 attains its final value within some sec. or min. when i_1 is 10^{-8} amp., and within, e.g., 0.2 sec. when $i_1 \sim 2.10^{-5}$ amp. Oscillograms show that before i_2 is reached many spark breakthroughs of the dielec. film, they cause the rise of attainment of i_2 to be so long. It is uncertain why these sparks occur and why they stop. When i_1 is switched off, i_2 drops the more rapidly the higher it was so that after, e.g., 10 sec. the value of i_2 is independent of its original value. When the collector is connected with a potential-source through a high resistance (e.g., 5.10^6 ohms), the value of i_2 after discontinuation of i_1 is independent of i_1 and depends only on U_c. This probably shows that the charge on the film surface can be kept up by the ions of the gas remnants



Secondary electron emission of thin films of alkali metal halides. D. V. Zernov and B. S. Kul'varskaya (Automatic and Telemech. Inst., Acad. Sci. U.S.S.R., Moscow). *J. Tech. Phys.* (U.S.S.R.) 16, 71-82(1946). Exposure to air having been found to result in abnormally high values of the coeff. of secondary emission σ, of the order of 10^3 and more, the deposition of the halide film on a Ni foil and the subsequent electronic investigation were carried out in the same closed app., with a magnetic device used to switch the foil from the mol.-evapn. vacuum chamber to the electronic chamber. For KCl, with a primary-electron current intensity i_p of 0.2 microamp., primary-electron velocity U_p = 400 v., the shape of the curves of σ against the voltage U_c applied to the collector electrode depends on the thickness d of the halide layer; at d = 2000 A., as detd. by the first order interference spectrum, the curve rises steeply up to about U_c = 30, σ = 7 from where on σ remains practically const. With layers about 3-4 times as thick, σ rises less steeply, reaching about the same satn. value of about 7 at about U_c = 70 v. This is interpreted as an effect of the transverse elec. resistance R of the KCl layer, the condition of satn. having been shown to be $U_c/R > i_p(\sigma_0 - 1)$, where σ_0 = coeff. of the true secondary emission. On heavy KCl layers, d of the order 10^{-4} cm., not only is satn. absent altogether but the slope changes abruptly into a much steeper one at about U_c = 50 v.; at U_c = 120 v., σ attains a value of about 1000, which can only be ascribed to autoelectronic emission. The latter is detd. by the tunnel-current intensity i_t from the metal foil to the halide layer, $i_t = 1.7 \times 10^{13} E^2 10^{-10^8 Q^3/E}$ amp./sq. cm., where Q = width of the forbidden zone, assumed = 6.7 v. for KCl, and E = field gradient within the layer, at low U_c it is approx. $E \approx U_c/d$. The calcd. curve of i_t against E actually resembles the exptl. curve of σ against U_c for thick KCl layers. However, the value of E at which the autoelectronic current becomes sizable, as deduced from the exptl. curve for $d = 10^{-4}$ cm., is $E = 0.5 \times 10^6$ v./cm., as against 1.0×10^6 from the theoretical curve; the agreement is only in the order of magnitude, owing no doubt to nonhomogeneity of the surface of the layer and to inadequacy of approximating assumptions. At const. U_c = 150 v. and U_p = 400 v., for thin KCl layers, σ at satn. was found to be independent of the primary current i_p between 0.3 and 2.8 microamp.; this amounts to independence of σ of E and consequently confirms the absence of autoelectronic emission where the value of σ is not over 10. In the presence of an autoelectronic effect, σ proves to be very strongly dependent on i_p, at const. U_c and U_p, the curve starting with a steeply rising portion, attaining a max., for example at about 0.25 microamp., σ > 400, followed by a uniform decline; the general shape of the curve is always the same

even though the numerical values at the max. may vary according to the specimen. In the absence of autoelectronic emission, plots of σ against the voltage (velocity) U_p of the primary electrons, at const. i_p = 0.2 microamp. and U_s = 180 v., consist of a rising branch leveling off in satn. at about U_p = 600-800 v., with σ not over 10, while in the case of thick layers in which autoelectronic emission is prevalent the curve has a max. at about U_p = 200 v., the values of σ being of the order 100-600. The sharp fall of σ beyond the max. is ascribed to elec. cond. induced in the KCl by the fast primary electrons and the resulting lowering of inner field strength, which checks the autoelectronic emission. In analogy with the Al-Al_2O_3-Cs_2O emitters, KCl also shows time-lag phenomena in both the establishment and the damping of the secondary emission current. On a primary impulse of 0.05 sec., 0.2 microamp., the secondary current does attain its full amplitude and is damped completely within a few hundredths of a sec.; with shorter primary impulses, secondary emission does not attain its full stationary value and its oscillographic record shows symmetrical rise and fall of the current. Time-lag phenomena are present whenever autoelectronic emission predominates.

N. Thon



Energy distribution of secondary electrons emitted by thin dielectric films. D. V. Zernov and B. S. Kul'varskaya (Acad. Sci. U.S.S.R., Moscow). *J. Tech. Phys.* (U.S.S.R.) 16, 771-82(1946).—The arrangement usual for electron emission by metals does not give correct results for emission by dielec. films because of the potential drop within these films. The energy distribution of electrons emitted by a KCl film on Ni was measured in a tube the inner wall of which was coated with a conducting film kept at 150-200 v. In the presence of this accelerating electrode the charges of the collector electrode do not affect the potential gradient and the current within the dielectric. A KCl film about 2 μ thick has a curve *i* against *U* similar to that of uncoated Ni but shifted by several v. *i* is the secondary-current strength, and *U* is the potential of the collector electrode. When the KCl film is about 8 μ thick, *i* increases with *U* in 2 stages; this shows that the secondary electrons are of 2 kinds: (1) usual secondary electrons, and (2) electrons which are extd. from the metal subphase by the elec. field and cross the dielec. film without a considerable loss of energy. The *U* at which di/dU for the electrons of the 2nd kind passes through a max. is near the Fermi level of the metal subphase. When the KCl film is thicker still, the autoelectronic emission (i.e. that of the 2nd kind is so much more intensive than the normal secondary emission that the latter cannot be detected on the *i-U* curves. The coeff. of secondary emission (including both kinds) reaches 260 at these thicknesses. The high energy of the "autoelectrons" is discussed. J. J. Bikerman

D. V. Zernov

The mechanism of the autoelectronic emission of thin dielectric films. D. V. Zernov. *J. Tech. Phys.* (U.S.S.R.) 16, 931–4 (1946); cf. preceding abstr.—Electrons emitted into a vacuum from a dielec. film on metal when the film-vacuum boundary is charged positively originate from the metal. They can enter the dielectric in great nos. because the field E created by the boundary charges lowers the potential barrier from φ in the absence of the field to $\varphi - (e^3E/\epsilon)^{1/2}$; e is the electronic charge, and ϵ the dielec. const. of the film. Since E is of the order 10^6 v./cm. and the films are 10^{-5} to 10^{-4} cm. thick, practically every electron entering the film from the metal is emitted into the vacuum and loses almost no energy within the film. The inertia of the autoelectronic emission of dielectric films. *Ibid.* 935–6.—In the secondary electron emission of films showing interference colors of the first order, the secondary current follows the primary current at all frequencies between 20 and 500 sec^{-1}. The secondary emission of thicker films (colors of the 3rd to 7th order) is great at small and small at great frequencies; e.g., at 20 sec^{-1} it is 5 times that at 500 sec^{-1}. This lag is characteristic of the autoelectronic emission.

I. J. Hikerman

C A

Temperature dependence of the electronic emission of dielectric films under the influence of the field of a positive surface charge. D. V. Zernov and B. S. Kul'varskaya, *Zhur. Tekh. Fiz.* 17, 309 18(1947); cf. C.A. 41, 000g.—By wave-mech. considerations, based on a tunnel effect through which the cond. zone of a dielec. layer becomes enriched in electrons originating in the metallic side of the emitter, the relation between the c.d. of the emission, j, and the voltage E in the film, is, in its simplified form, $j = (2hc^2/e^2ma^2)(E^2/Q^2)e^{-\gamma Q^2/E}$, where a = lattice const., Q = width of the forbidden zone sepg. the upper occupied and the cond. zone of the dielec., and $\gamma = (e/h)(ma/e)^{1/2}$. With the numerical values introduced, and $a = 3 \times 10^{-8}$ cm., $j = 8.3 \times 10^{-6}(E^2/Q^2)10^{-10Q^2/E}$ amp./sq. cm., if E is in v./cm. and Q in v. With the potential at the surface of the dielec. layer taken to be close to the collector electrode potential U, the relation between U and the emission current intensity I ought to be of the form $I = BU^2 \times 10^{-\beta/U}$, with $B = 8.3 \times 10^{-6}\ S/Q^2\beta^2$ (where d = thickness of the dielec. layer, S = its surface area), and $\beta = 10^8Q^2d$. On the other hand, if the emission is due to an analog of the Schottky effect, consisting in thermal emission of electrons from the metal into the dielec. owing to the elec. field in the latter, the relation should be $j = j_0e^{b\sqrt{E}}$, with $j_0 = AT^2e^{-e\varphi/kT}$, and $b = \sqrt{e^3}/kT$, where A = Richardson's const., φ = height of the potential barrier at the metal/dielec. boundary, ϵ = the dielec. const. On the same assumption as above, i.e. if $Ed = U$, the relation between U and I ought to be $I = I_0 \times 10^{\alpha\sqrt{U}}$, with $\alpha = 1.97/T\sqrt{\epsilon d}$ and $I_0 = j_0S$. In the theory based on consideration of the tunnel effect, temp. is not involved, and the emission should be independent of the temp. By the thermal-emission theory, the emission should decrease rapidly with falling temp. Expts. with KCl films, at any single temp., do not permit decision between the 2 alternative theories; thus, at 15°, the exptl. curve (U = 10-50 v.) is rendered as satisfactorily by $I = 0.29\ I^{-0.3} \times 10^{-0.07/U}$ as by $I = 6.3 \times 10^{-4} \times 10^{0.78\sqrt{U}}$ (in microamps.). Comparison of the calcd. and the exptl. values of the parameters is rather unfavorable to the tunnel-effect theory. For the coeff. α, the "Schottky-effect" theory gives values from 0.31 to 0.96, consistent with those obtained from expts., e.g., at 15°, α = 0.78. The exptl. I_0 is consistent with the "Schottky-effect" theoretical value if $\varphi < 1$ e.v., e.g., at 15°, φ = 0.03 e.v., which appears plausible, although lower than the value (2 e.v.) derived from the photoelec. effect from metal to dielec. The exptl. temp. dependence contradicts both theories. At lower temps., −9, 0, and 15°, the slope of the straight lines $\log I = f(\sqrt{U})$ increases with rising temp., but above 30° it decreases. On the whole, preference is to be given to the theory of thermal ionization, promoted by the elec. field in the dielec. The fall of the emission with rising temp., observed at higher temps., can be attributed to a decrease of the field in the dielec. owing to neutralization of the surface charge by the ionic component of the current. The temp. dependence of I at lower temps. is qualitatively analogous to that of the pre-breakdown current in dielectrics; the existing deviations may be due to space charges in the film. N. T.

On the Mechanism of the Electrical Breakdown of Solid Dielectrics

By D. V. Zernov. (From *Izvestiya Akademii Nauk, Russia*, No. 6, 1950, pp. 866-872, 1 illustration.)

In this paper, the author deals with results of investigations on the electrical breakdown of very thin layers of solid dielectrics. The experiments were carried out with dielectric layers of thicknesses varying between 10^{-4} and 10^{-5} cm deposited on a metal base. From the results obtained, the author concludes that there is a definite similarity between the phenomena observed in the final stages of breakdown in the case of compressed gases and those occurring in thin layers of solid dielectrics. In his view, the breakdown is not a result of increasing conductivity prior to the final breakdown, but is due to the development of a single avalanche owing to impulse ionisation by the tied electrons of the lattice of the dielectric. In very thin dielectric layers, discharge phenomena occur which are similar to corona discharges in compressed gases.

Although the phenomena which occur in compressed gases if they are subject to the influence of a strong dielectric field are similar to those taking place in a solid dielectric under comparable conditions, the breakdown strength of solid dielectrics cannot be increased in the same way as it can be increased in the case of gases. To obtain an increased dielectric strength of a solid dielectric in this way, it would be necessary to reduce the thickness of the dielectric layer to such small values that a relatively small voltage drop across the layer may cause a rather large flow of current due to freeing of electrons from the dielectric layer by the intensive electric field, a process which is not related to impulse ionisation.

ZERNOV, D. V. (Corr. Mem.); YELINSON, M. I. (Cand. Tech. Sci.); KHARCHENKO, A.M. (Eng.)

"Review of Possibilities of Development of New Types of Electronic Apparatus for Automatic and Telemechanical Constructions,"

paper read at the Session of the Acad. of Sci. USSR, on Scientific Problems of Automatic Production, 15-20 October 1956.

Avtomatika i telemekhanika, No. 2, p. 182-192, 1957.

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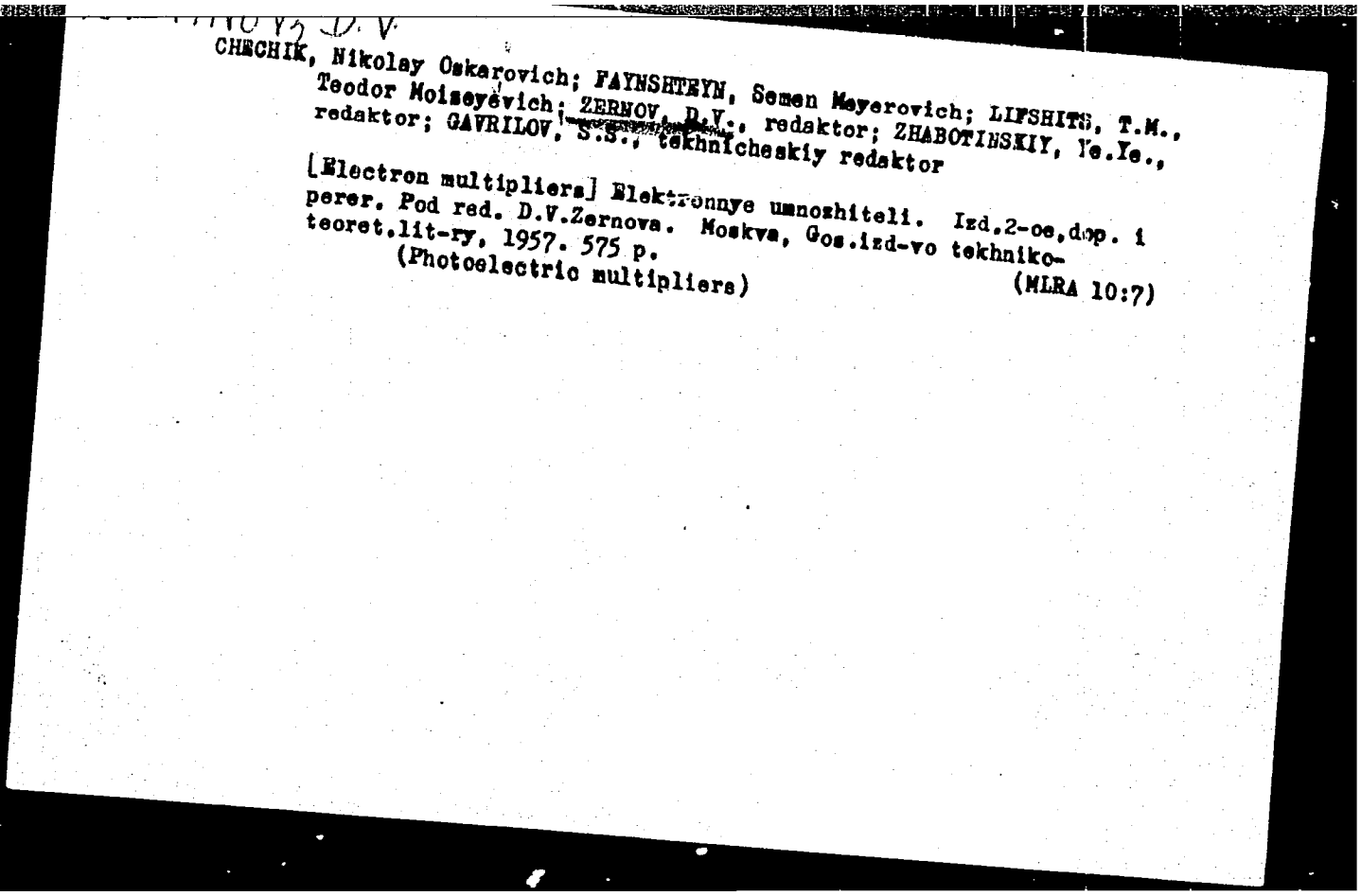
ZERNOV, D.V.

Autoelectronic emission and autoelectronic cathodes. Izv.AN SSSR.Ser. fiz. 20 no.10:1135-1136 O '56. (MLRA 10:1)

1. Institut radiotekhniki i elektroniki Akademii nauk SSSR.
(Electron emission)

ZERNOV, D.V.; YELINSON, M.I.

Field emission and field-emission cathodes. Radiotekh.i elektron. 1 no.1:5-22 Ja '56. (MLRA 9:11)
(Electron emission)



CHECHIK, Nikolay Oskarovich; FAYNSHTEYN, Semen Meyerovich; LIFSHITS, T.M., Teodor Moiseyevich; ZERNOV, D.V., redaktor; ZHABOTINSKIY, Ye.Ye., redaktor; GAVRILOV, S.S., tekhnicheskiy redaktor

[Electron multipliers] Elektronnye umnozhiteli. Izd.2-oe,dop. i perer. Pod red. D.V.Zernova. Moskva, Gos.izd-vo tekhniko-teoret.lit-ry, 1957. 575 p.
(Photoelectric multipliers) (MLRA 10:7)

9(0)

Translation from: Referativnyy zhurnal. Elektrotekhnika, 1959, Nr 1, pp 209-210 (USSR) SOV/112-59-1-1505

AUTHOR: Zernov, D. V., Yelinson, M. I., and Kharchenko, A. M.

TITLE: Prospects for Developing New Types of Electronic Devices for Automatic and Telemechanic Equipment

PERIODICAL: Sessiya AS USSR po nauchn. probl. avtomatiz. proiz-va, 1956, Vol 3, M., AN SSSR, 1957, pp 59-81

ABSTRACT: Electronic devices are used in automatic and telemechanical systems for these purposes: (1) radiation primary elements (photoelectric devices), magnetic-field primary elements (magnetic-tape recorders), etc.; (2) amplifiers; (3) distributors (various pulse circuits that generate, convert, form, distribute, delay, count electric pulses, etc.); (4) converters of various types of signals; (5) multipliers and function tubes (used in computer-

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Prospects for Developing New Types of Electronic Devices for Automatic and Telemechanic . . . SOV/112-59-1-1505

type simulators); (6) storage devices for temporarily holding various signals available for subsequent readouts. In addition to conventional control-grid tubes, semiconductor devices, and various gas-discharge tubes, other electron devices are widely used: the devices acting as primary elements in transmission of movement, acceleration, pressure, magnetic field, etc., and special devices intended to replace a number of electron tubes; using a large number of tubes reduces reliability of a system as a whole. As a rule, the latter devices are of electron-beam type; a great flexibility of the electron beam, which under the influence of electric and magnetic fields changes its intensity and spatial position, is used. A detailed critical review of commercially-available photoelectric devices is given, and prospects of using them in various fields are indicated; an electron-beam device intended to reproduce signals from a magnetic tape is described. The circuit and characteristics of a device developed by IRE AN SSSR are presented, as well

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Prospects for New Types of Electronic Devices for Automatic and Telemechanic . . .

as data on new high-transconductance tubes, grid-control secondary-emission tubes, beam-deflecting tubes, and electrometric tubes. A principal diagram is given of a simple 10-cavity ring trochotron developed by IRE AN SSSR; the trochotron develops output currents up to 10-12 ma and has output circuits independent of control and switching circuits. The trochotron can be used as a multichannel distributor for pulse counting, frequency division, modulating a single carrier by several audio channels, strobing and matrix circuits, coding, timing, etc. Information is submitted on a binary switch developed by IRE AN SSSR. A description is presented of electron-beam coding tubes and of secondary-emission contact tubes which are characterized by low internal resistance, about one kohm; the tubes can convert signals (DC into AC, change the type of modulation, help in noise elimination, or make reception more convenient, etc.); they can also serve for various types of switching, etc. Development of beam switching tubes with a small number of contacts in one envelope and multichannel tubes with a low input signal (10-100 microvolts and

Prospects for New Types of Electronic Devices for Automatic and Telemechanic . . . SOV/112-59-1-1505

lower) is promising. A few types of electron-beam multipliers and formatrons — the devices whose output current is a specified function of the input — i.e., function devices, are described. Data is also supplied on electron-beam storage tubes regularly produced in the USSR and on those described in foreign publications.

Ye. M. M.

Card 4/4

ZERNOV, D.V.; YELINSON, M.I.[Elinson, M.I.]

Field emission and autocathodes. Dok. such. fiz. no.5:231-250 '57. (MIRA 16:6)

(Field emission) (Cathodes)

AUTHOR: Yelinson, M. I., and Zernov, D. V. 109-2-1-10/17

TITLE: On the Mechanism of Electron Emission from Thin Dielectric Layers Under the Influence of a Strong Electric Field (Malter Effect) (K voprosu o mekhanizme elektronnoy emissii tonkikh dielektricheskikh sloyev pod deystviyem sil'nogo elektricheskogo polya (effekt Moltera))

PERIODICAL: Radiotekhnika i Elektronika, 1957, Vol 2, Nr 1, pp 75-84 (USSR)

ABSTRACT: Existing notions of the mechanism of the Malter effect are considered in the article. It is pointed out that these notions cannot explain all the known experimental facts of today. A new viewpoint is offered and substantiated, which is based on an assumption that the potential within the dielectric film is essentially nonhomogeneous.

The Malter effect is described, and the substances whose films are capable of producing such an effect are listed. It is considered unquestionable that the fundamental factor causing emission from a dielectric film is a strong electric field within the film. It is not clear, however, which of the many phenomena caused by a strong electric field is the fundamental phenomenon in the mechanism

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of emission. A number of published experimental works are reviewed, and these inferences drawn: (A) Electron velocity spectrum comprises two groups, slow and fast; the latter consists of Malter electrons. (B) Energies of Malter electrons are grouped around the Fermi level of the backing. (C) With film thicknesses close to the critical thickness, the width of the Malter-electron spectrum is relatively small (about 4 volts). For a film 50% thicker, the spectrum width is about 14 volts. (D) A variation of the work function of the collector material is associated with a shift of the velocity-distribution curve, just as in the case of a field emission in a vacuum.

Two existing theories of the Malter emission are criticized and are either found to be unable to explain some of the known facts, or to be contradictory to them. The new qualitative theory of Malter effect offered by the authors is based on the following principal facts: (A) The Zener formula (reference 17) cannot be used for calculating field emission current from the metal backing into the dielectric; (B) A sharp rise in breakdown field intensity of thin dielectric films, starting from $2 \cdot 10^{-5}$ cm and thinner, has been found experimentally and

On the Mechanism of Electron Emission from Thin Dielectric Layers (Cont.)

substantiated theoretically. Film breakdowns, fluorescence of emission spots, self-sustaining of emission, etc., testify to the fact that non-elastic collisions of Malter electrons with lattice, i.e., excitation and shock ionization, take place within the film. Grouping of emitted electrons around the Fermi level of the backing with a relatively high barrier at the metal-dielectric boundary conclusively demonstrates the tunnel mechanism of electron transition from the backing into the dielectric film. Apparently, it can be assumed that practically all voltage drop is concentrated close to the surface of the backing (figure 4), within 250÷100 Å. It should also be assumed that the Malter emission has a steady-state nature. With very thin films, only a small part of fast electrons takes part in ionization; this part grows with the thickness of the film. It is natural to assume that at some spots of the film, the potential has a near-linear distribution. The authors examine in detail many experimental facts corroborating the above viewpoint. The irregular potential distribution within the film is due to spatial distribution of impurities within the film and also to the distribution of their energy levels, according to the authors. If this mechanism of

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the phenomenon is correct, the Malter emission may be controlled by doping the dielectric.

There are 4 figures and 26 references, 10 of which are Soviet, in the article.

SUBMITTED: August 15, 1956

AVAILABLE: Library of Congress

1. Electrons--Velocity 2. Electrons--Energy 3. Dielectrics--Applications 4. Mathematics--Applications

YELINSON, Mordukh Il'ich; VASIL'YEV, Gennadiy Fedorovich; ZERNOV, D.V., red.; STAROKADOMSKAYA, Ye.L., red.; MURASHOVA, N.Ya., tekhn.red.

[Field emission] Avtoelektronnaia emissiia. Pod red. D.V.Zernova. Moskva, Gos.izd-vo fiziko-matem.lit-ry, 1958. 272 p. (MIRA 12:2)

1. Chlen-korrespondent AN SSSR (for Zernov).
(Electron emission)

AUTHORS: Alekseyeva, A.P., Basalayeva, N.Ya., Yelinson, M.I., Zernov, D.V., Kul'varskaya, B.S., Lifshits, T.M., Savitskaya, Ya.S., Sena, L.A., Shabel'nikova, A.E. and Yurasova, V.Ye. SOV/109-3-8-17/18

TITLE: The Eighth All-Union Conference on Cathode Electronics (8-ye vsesoyuznoye soveshchaniye po katodnoy elektronike)

PERIODICAL: Radiotekhnika i Elektronika, 1958, Vol 3, Nr 8, pp 1092 - 1103 (USSR)

ABSTRACT: The conference took place during October 17 - 24, 1957 in Leningrad at the Fiziko-tekhnicheskiy institut AN SSSR (Physics-engineering Institute of the Ac.Sc.USSR). It was organised by the Soviet Ac.Sc. and was attended by Soviet scientists from Moscow, Leningrad, Kiyev and other towns of the Soviet Union as well as by delegates from Hungary, Czechoslovakia and Romania. Altogether, over one hundred lectures were delivered at the conference. These were divided into the following sections: thermionic emission and the technology of thermionic cathodes; secondary electron emission; photo-electron emission; field electron emission; cathode conductivity phenomena; ionic processes and gas discharges. Some of the papers

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read at the conference are published in the present issue of the journal: in fact, all the papers in this issue were read at the conference. Some of the papers were published in an earlier issue of the journal (Vol 2, Nr 12, 1957). A number of papers from the conference are being published in "Izvestiya AN SSSR, Ser. Fiz" Nrs 4 and 5 and also in various other journals. The present report gives brief summaries of a large number of the papers presented at the conference.

SUBMITTED: February 4, 1958

Card 2/2 1. Cathodes (Electron tube) 2. Thermionic emission 3. Secondary emission 4. Photoemission 5. Field emission

ZERNOV, D. V.

11 июня

(с 18 до 22 часов)

Г. М. Рапопорт

Возбуждение колебаний электронным пучком с периодически изменяющейся траекторией

С. Г. Афанасьев

Об управлении частотой триодного генератора.

А. Н. Чинин

Низкочастотные шумы современных электронных ламп

М. С. Ардаев

Метод получения [illegible] электронных ламп.

12 июня

(с 10 до 16 часов)

В. В. Богданов,
В. Я. Киселев,
З. С. Чернов

Взаимодействие электронного потока с плазмой.

36

Г. Д. Лобов

Газоразрядный детектор СВЧ колебаний

А. М. [illegible],
И. Н. [illegible],
С. С. [illegible]

Волноводные умножители частоты на [illegible] электронных пучках.

А. М. Харченко,
В. В. [illegible],
М. И. Елинсон,
Д. В. Зернов

Электронные контактные явления у некоторых [illegible]

8. СЕКЦИЯ РАДИОИЗМЕРЕНИЙ

Руководитель Г. Д. Бурдун

9 июня

(с 10 до 16 часов)

А. Г. [illegible]

О перспективах повышения стабильности кварцевых генераторов для эталонов частоты

37

report submitted for the Centennial Meeting of the Scientific Technological Society of Radio Engineering and Electrical Communications im. A. S. Popov (VNORiE), Moscow, 8-12 June. 1959

9.4120

69928
S/109/60/005/05/016/021
E140/E435

AUTHORS: Bykhovskaya, Ye.V., Kharchenko, A.M., Yelinson, M.I. and Zernov, D.V.

TITLE: Electron-Beam Switching Tubes

PERIODICAL: Radiotekhnika i elektronika, 1960, Vol 5, Nr 5, pp 849-857 (USSR)

ABSTRACT: The theory of beam switching tubes is discussed and then certain types of single-contact and multi-contact tubes and their basic parameters are described. The single-contact tubes have low internal resistance in the conducting stage 1.5 to 2.5 kΩ and substantial operating currents up to 20 mA with high resistance (10^4 MΩ) in the open state. The multi-contact tubes have 5 to 10 contacts with resistances of 5 to 10 kΩ with operating currents up to 2 mA. High-voltage tubes permitting the switching of signals at potentials higher than 1 kV have also been developed. There are 15 figures and 3 references, 2 of which are German and 1 English.

SUBMITTED: February 7, 1959

Card 1/1

8

S/109/60/005/05/020/021
E140/E435

AUTHORS: Basalayeva, N.Ya., Vikhlyayeva, R.P., Zhdan, A.G., Zernov, D.V., Kofanova, T.I., Pervova, L.Ya., Politova, N.M., Polyakova, M.A., Popov, B.N., Spivak, G.V., Shabel'nikova, A.E. and Yasnopol'skaya, A.

TITLE: Report on the Ninth All-Union Conference on Cathode Electronics

PERIODICAL: Radiotekhnika i elektronika, 1960, Vol 5, Nr 5, pp 866-879 (USSR)

ABSTRACT: This conference took place in Moscow from 21-28th October 1959 with the participation of Soviet scientists and guests from Hungary, Eastern Germany, the Chinese Peoples' Republic and Czechoslovakia. The chairman of the organization committee was Academician Vekshinskiy. The report consists of brief abstracts of 125 papers presented at the plenary sessions and the sections of the conference. 15 Reports were presented in the section on surface properties of solids dealing with electron adsorption and structural properties of active surface films. Electron-optical studies of "patch fields" on emitting surfaces were discussed. 6 Papers on the

Card 1/2

29321
S/109/61/006/010/019/027
D/246/D302

9,3130 (1003, 1138, 1160, 1331)

AUTHORS: Basalayeva, N.Ya., Yekimenko, T.M., Yelinson, M.I., Zernov, D.V., Savitskaya, Ya.S., and Yasnopol'skaya, A.A.

TITLE: Investigating some properties of a cold magnesium-oxide cathode with self-enhancing emission

PERIODICAL: Radiotekhnika i elektronika, v. 6, no. 10, 1961, 1720 - 1740

TEXT: The aim of this work was to study some properties of cold magnesium oxide cathodes which were not investigated in technical literature. In the experimental apparatus, cathodes made by cataphoresis and spraying were used, with varying thicknesses (6 - 35 μ and 12-60 μ, respectively). They both had high porousness (80 % of the total volume). They had nickel substrate of the type NM (magnesium added) and platinized nickel. The instrument used was a diode with tubular cathode of oval cross-section and a mesh-anode. The starter used was a thin (100 μ ∅) tungsten filament. The ca-

Card 1/6

Investigating some properties ...

thode was activated by baking it for 10 min. at 850°C. Number of specimens approx. 400. Their volt-ampere characteristics corresponded to those in the literature. a) To investigate the effect of oxygen, specimens were oxidized in cycles, at 850°C in atmosphere, starting at 0.1 mm of Hg pressure. Then the max. stable current, I_e was measured with the corresponding potential difference, U_a, between anode and cathode. I_e/U_a was then taken as an approximate criterion of the quality of the cathode. Fig. 4 shows I_e/U_a as a function of the number of cycles (N) for cataphoresis cathodes. Fig. 5 – the same for sprayed cathodes. The same types of curves were obtained for platinized nickel substrate (Pt layer ~50 μ thick), which proves that NiO layer does not play any significant role in the mechanism of emission. b) Investigation of temperature-dependence showed that there are both reversible and irreversible changes of the emission. If the cathode is heated higher than 400°C, irreversible processes start. It was shown that heating up the MgO layer is responsible for limiting current density, hence, improvement by its cooling. c) The time dependence of the starting process was also investigated. It was shown that it is sufficient to

Card 2/6

ZERNOV, D.V.

BERG, A.I., glav. red.; TRAPEZNIKOV, V.A., glav. red.; BERKOVICH, D.M., zaml glav. red.; LERNER, A.Ya., doktor tekhn. nauk, prof., zam. glav. red.; AVEN, O.I., red.; AGEYKIN, D.I., red.; kand. tekhn. nauk, dots., red.; AYZERMAN, M.A., red.; VENIKOV, V.A., doktor tekhn. nauk, prof., red.; VORONOV, A.A., doktor tekhn. nauk, prof., red.; GAVRILOV, M.A., doktor tekhn. nauk, prof., red.; ZERNOV, D.V., red.; IL'IN, V.A., doktor tekhn. nauk, prof., red.; KITOV, A.I., kand. tekhn. nauk, red.; KOGAN, B.YA., doktor tekhn. nauk, red.; KOSTOUSOV, A.I., red.; KRUGLITSKIY, N.A., kand. fiz.-mat. nauk red.; LEVIN, G.A., prof. red.; LOZINSKIY, M.G., doktor tekhn. nauk, red.; [illegible], red.; MAKSAREV, Yu.Ye., red.; MASLOV, A.A., dots., red.; POPKOV, A.A., red.; RAKOVSKIY, M.Ye., red.; ROZENBERG, L.D., doktor tekhn. nauk, prof., red.; SOTSKOV, B.S., red.; TIMOFEYEV, P.V., red.; USHAKOV, V.B., doktor tekhn. nauk, red.; FEL'DBAUM, A.A., doktor tekhn. nauk, prof., red.; FROLOV, V.S., red.; KHARKEVICH, A.A., red.; KHRAMOY, A.V., kand. tekhn. nauk, red.; TSYPKIN, Ya.Z., doktor tekhn. nauk, prof., red.; CHELYUSTKIN, A.B., kand. tekhn. nauk, red.; SHREYDER, Yu.A., kand. fiz.-mat. nauk, dots., red.; BOCHAROVA, M.D., kand. tekhn. nauk, starshiy nauchnyy red.; DELONE, N.N., inzh., nauchnyy red.; BARANOV, V.I., nauchnyy red.; PAVLOVA, T.I., tekhn. red.

(Continued on next card)

BERG, A.I.--- (continued). Card 2.

[Industrial electronics and automation of production processes]Avtomatizatsiia proizvodstva i promyshlennaia elektronika. Glav. red. A.I.Berg i V.A.Trapeznikov. Moskva, Gos.nauchn. izd-vo "Sovetskaia Entsiklopediia." Vol.1. A - I. 1962. 524 p. (MIRA 15:10)

1. Chlen-korrespondent Akademii nauk SSSR (for Sotskov, Kharkevich, Zernov, Timofeyev, Popkov).

(Automatic control) (Electronic control)

L 12923-63 EWT(l)/EWG(k)/EWP(q)/EWT(m)/ES(w)-2/BDS AFFTC/ASD/SSD/
ESD-3 Pz-4/Pab-4 JD/AT/IJP(C)
ACCESSION NR: AP3000573 S/0109/63/008/005/0878/0880

AUTHOR: Basalayeva, N. Ya.; Yelinson, M. I.; Zernov, D. V. 73

TITLE: Relationship of self-sustained MgO cathode emission to temperature

SOURCE: Radiotekhnika i elektronika, v. 8, no. 5, 1963, 878-880

TOPIC TAGS: self-sustained cathode emission, liquid-nitrogen temperature

ABSTRACT: A device has been developed for investigating variations of the self-sustained cold-cathode emission from an MgO cathode with changes in temperature within a range from -196 to +500C. The MgO layer was deposited along the center portion of a 3-mm diameter nickel tube closed at one end, which was then sealed in a glass flask. Heating was effected by passing current through the sector of the tube bearing the MgO; the sector was cooled by filling the tube with liquid nitrogen. Prior to making temperature measurements the device was submerged in liquid nitrogen in order to avoid local condensation of residual gases and vapors upon cooling of the cathode. Measurements have shown that at a temperature close to -196C self-sustained emission stopped completely. From -120 to -160C, a few microamperes of self-emission was achieved. With a further

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L 12923-63
ACCESSION NR: AP3000573

increase in temperature, current increased slowly at first and then rose rapidly, passing to a maximum at about 200C, and afterwards dropped off steadily up to the 500C test level. A different curve was generated by decreasing temperatures, giving a hysteresis ascribed to residual effects in the cathode. It is suggested that the sharp drop of emission with decrease in temperature is due to the accumulation of space charges resulting in a field distribution within the surface layer which inhibits emission. The decrease at high temperature is due to the decrease of field within the layer owing to an increase in its conductivity. Orig. art. has: 3 figures.

ASSOCIATION: none

SUBMITTED: 12Jan63 DATE ACQ: 30May63 ENCL: 00

SUB CODE: PH NO REF SOV: 003 OTHER: 000

Card 2/2

L 10490-63 EWT(l)/EWG(k)/EWT(m)/BDS/ES(w)-2--AFFTC/ASD/ESD-3/SSD--
Pz-4/Pab-4--AT/RH
ACCESSION NR: AP3000574 S/0109/63/008/005/0881/0883

AUTHOR: Basalayeva, N. Ya; Yelinson, M. I.; Zernov, D. V.; Savitskaya, Ya. S.

TITLE: The role of porosity of cathodes with self-sustained emission

SOURCE: Radiotekhnika i elektronika, v. 8, no. 5, 1963, 881-883

TOPIC TAGS: cold cathode, self-sustained emission, nonporous surface, emitter porosity, current emission, anode voltage, dielectric material, uniform magnetic field

ABSTRACT: A device has been developed for the investigation of the distribution of cold-cathode self-sustained emission from a nearly nonporous surface in order to establish a correlation between the emission phenomenon and emitter porosity. Al_2O_3 was selected as the dielectric material because of its low porosity and was deposited in thicknesses between several hundred and several thousand Angstroms. The entire device was placed in a uniform magnetic field directed perpendicular to the cathode surface, so that the pattern of current emission could be observed on a fluorescent screen. The behavior of emission as a function of anode voltage and time elapsed after the application of starting current is described. After

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ACCESSION NR: AP3000574

testing, the tube was dismounted and the distribution of pores in the Al_2O_3 layer was investigated. The results showed that at film thicknesses above 1000 A the emission originated from 1 to 3 centers located close to the cathode ends, where the film was apparently thinner and contained fissures. The main part of the cathode, where no pores were detected did not emit. In films of several hundred Angstroms in thickness the presence of individual point centers of emission, densely and uniformly distributed on the cathode surface, and a corresponding pattern of porosity distribution were observed. It appears form the Al_2O_3 tests that some porosity is a requisite for self-sustained emission. However, this conclusion should not be arbitrarily extended to other dielectric materials, which may possibly emit from compact (non-porous) layers. Orig. art. has: 3 figures.

ASSOCIATION: none

SUBMITTED: 12Jan63 DATE ACQ: 30May63 ENCL: 00

SUB CODE: PH NO REF SOV: 002 OTHER: 001

88/GM
Card 2/2

SOURCE: Radiotekhnika i elektronika, v. 9, no. 11, 1964, 1903-1919

TOPIC TAGS: electron emission, dielectric layer

ABSTRACT: Based on 1936-63 Western and 1937-64 Soviet sources, the review [illegible] mechanisms of electron emission from metal-backed dielectric [illegible] source of a strong [illegible] field. The emission [illegible] metal-dielectric structures [illegible] etc., is discussed in detail. Works on inertialess field-reinforced [illegible] electron emission and on cold-cathode self-sustained emission are summarized. [illegible] conclusion is drawn that different mechanisms of emission, such as tunnel

Card 1/2

L 41508-65

ACCESSION NR: AP4048874

0

...barrier transition, avalanche development, etc., are involved in the ... A discussion of the mechanism of classical Maiter ...

ENCL ...

Card 2/2 mc

VVEDENSKIY, B.A., glav. red.; VUL, B.M., glav. red.; SHTEYNMAN, R.Ya., zam. glav. red.; BALDIN, A.M., red.; VONSOVSKIY, S.V., red.; GALANIN, M.D., red.; ZERNOV, D.V., red.; ISHLINSKIY, A.Yu., red.; K[illegible]ITSA, P.L., red.; KAPTSOV, N.A., red.; KOZODAYEV, M.S., red.; LEVICH, V.G., red.; LOYTSYANSKIY, L.G., red.; LUK'YANOV, S.Yu., red.; MAILYSHEV, V.I., red.; MIGULIN, V.V., red.; REBINDER, P.A., red.; SYRKIN, Ya.K., red.; TARG, S.M., red.; TYAPLIKOV, S.V., red.; FEYNBERG, Ye.L., red.; KHAYKIN, S.E., red.; SHUBNIKOV, A.V., red.

[Encyclopedic physics dictionary] Fizicheskii entsiklopedicheskii slovar'. Moskva, Sovetskaia Entsiklopediia. Vol.4. 1965. 592 p. (MIRA 18:1)

SOBOLEVA, Nina Aleksandrovna; BERKOVSKIY, Arkadiy Grigor'yevich; CHECHIK, Noson Osherovich; YELISEYEV, Reyngol'd Yevgen'yevich; ZERNOV, D.V., red.; CHEBOTAREVA, A.V., red.

[Photoelectronic instruments] Fotoelektronnye pribory. Moskva, Nauka, 1965. 592 p. (MIRA 18:12)

L 07096-67 EWT(1)/EWT(m)/EWP(t)/ETI IJP(c) JD/AT

ACC NR: AP6019000 SOURCE CODE: UR/0109/66/011/006/1100/1106

AUTHOR: Polyakova, M. A. (Deceased); Zernov, D. V.

ORG: none

TITLE: Photoelectric and optical properties of tellurium-rubidium photocathodes

SOURCE: Radiotekhnika i elektronika, v. 11, no. 6, 1966, 1100-1106

TOPIC TAGS: photocathode, UV receiver, TELLURIUM, RUBIDIUM, OPTIC PROPERTY, PHOTOELECTRIC PROPERTY

ABSTRACT: The results are reported of an experimental study of (a) the effect of the degree of activation of Te by Rb on the spectral characteristics of Te-Rb photocathode and (b) the effect of the thickness of Te layer on the photocathode sensitivity at $\lambda = 2600$ Å with frontal and rear illumination. The results of the study can be used in designing sun-blind 2000—3000 Å receivers. The best spectral characteristics were obtained when Te was activated by Rb vapor and the

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UDC: 621.383.73

L 07096-67

ACC NR: AP6019000

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photocurrent was monitored; the photocathode was illuminated by a bactericide lamp whose maximum radiation lay at $\lambda = 2537$ Å; optimal activation resulted when the process was stopped after a maximum photocurrent had been attained. An excess of Rb resulted in a higher sensitivity in the over-3000 Å band. With frontal illumination, the Te-Rb photocathode sensitivity to 2600-Å radiation increased with the thickness of the Te layer up to 200 Å, and beyond that thickness, varied but little. With the rear illumination, the maximum sensitivity corresponded to a Te layer thickness of about 60 Å. Plots of optical transmissivity and quantum yield of the Te-Rb photocathode vs. photon energy are shown. Orig. art. has: 4 figures and 3 formulas.

SUB CODE: 09 / SUBM DATE: 27Jan66 / ORIG REF: 001 / OTH REF: 006

Card 2/2

L 38900-66 EWT(1)
ACC NR: AP6029724 SOURCE CODE: UR/0109/66/011/005/0966/0967

AUTHOR: Zernov, D. V.; Timofeyev, P. V.; Fursov, V. S.; Migulin, V. V.; Spivak, G. V.; Spasskiy, B. I.; Nilender, R. A.; Grozdover, S. D.; Shemayev, A. M.; Solntsev, G. S.; Kuzovnikov, A. A.; Zaytsev, A. A.; Vasil'yeva, M. Ya.; Mitsuk, V. Ye.; Dubinina, Ye. M.; Zheludeva, G. A.

ORG: none

TITLE: Nikolay Aleksandrovich Kaptsov

SOURCE: Radiotekhnika i elektronika, v. 11, no. 5, 1966, 966-967

TOPIC TAGS: electric engineering personnel, magnetron, klystron, corona discharge, gas conduction, gas discharge plasma

ABSTRACT: N. A. Kaptsov passed away 10 February 1966. He was a student of the famous P. N. Lebedev, and performed many fundamental investigations in the development of modern electronics. He was the creator and leader of the chair of electronics of Moscow State University. He developed the concept of phase grouping of electrons. His ideas are the basis for the development of the magnetron and klystron. He developed the concept explaining the phenomenon of corona discharge. He also developed ideas connected with formation of gas conduction and phenomena in a gaseous-discharge plasma. Kaptsov served for years as the head of the physical laboratory and consultant to the Moscow Electron Tube Plant. He was the author of numerous books, including "Physical Phenomena in Vacuum and in Gases, which was translated into foreign languages; he also created and taught numerous electronics courses. [JPRS: 36,501]

SUB CODE: 05, 09 / SUBM DATE: none

Card 1/1 mlp

0918 0203

ZERNOV, G.

Potentials for economizing on cement in construction. Stroitel', no.4:30 Ap '61. (MIRA 14:5)
(Concrete—Curing)

NOSENKO, Nikolay Yevlampiyevich; PIGOLEV, S.V., red.; ZERNOV, G.M., otv. za vypusk; SUKHAREVA, R.A., tekhn.red.

[Mechanization and automation in the construction industry] Mekhanizatsiia i avtomatizatsiia v stroitel'stve. Moskva, 1960. 67 p. (Moskovskii dom nauchno-tekhnicheskoi propagandy. Peredovoi opyt proizvodstva. Seriia: "Stroitel'stvo," vyp. 12). (MIRA 14:1)

(Building machinery) (Construction industry) (Automatic control)

ZERNOV, Georgiy Silych; FOMINYKH, Vadim Nikolayevich; GETLING, Yu., red.; KVITKA, V., khudozh.-tekhn.red.

[Solicitude for our city] Zabota o rodnom gorode; iz opyta raboty Alapaevskoi partiinoi organizatsii. Sverdlovsk, Sverdlovskoe knizhnoe izd-vo, 1957. 54 p. (MIRA 13:2)

1. Sekretar' Alapayevskogo gorkoma Kommunisticheskoy partii Sovetskogo Soyuza (for Zernov). 2. Instruktor obkoma Kommunisticheskoy partii Sovetskogo Soyuza (for Fominykh).
(Alapaevsk--Building)

UTENKOV, Vladimir Fedorovich; VLASOVA, Mariya Andreyevna; FRENKEL', I.M., red.; ZERNOV, G.M., otv. za vypusk; SUKHAREVA, R.A., tekhn.red.

[Special problems in and methods for conducting building operations under winter conditions] Osobennosti i metody proizvodstva stroitel'nykh rabot v zimnee vremia. Moskva, Ob-vo po rasprostraneniiu polit. i nauchn.znanii RSFSR, 1959. 34 p. (Moskovskii dom nauchno-tekhnicheskoi propagandy. Peredovoi opyt proizvodstva. Serila: Stroitel'stvo, no.1). (MIRA 13:6)
(Building--Cold weather conditions)

EZDRIN, Konstantin Borisovich; FINKINSHTEYN, Boris Abramovich; VERSHININ, M.V., red.; ZERNOV, G.M., otv. za vypusk; SUKHAREVA, R.A., tekhn.red.

[Houses built of large keramzit-concrete panels; construction of block 11 in Novyye Cheremushki] Doma iz krupnykh keramzitobetonnykh panelei; opyt stroitel'stva 11-go kvartala Novykh Cheremushek. Moskva, 1959. 36 p. (Moskovskii dom nauchno-tekhnicheskoi propagandy. Peredovoi opyt proizvodstva. Seriia: Stroitel'stvo, vyp. 5). (MIRA 13:6)

(Moscow--Apartment houses)

ACC NR: AP6036866 SOURCE CODE: UR/0147/66/000/004/0136/0141

AUTHOR: Zernov, I. A.

ORG: none

TITLE: Use of combined coatings in radiation heating of blanks

SOURCE: IVUZ. Aviatsionnaya tekhnika, no. 4, 1966, 136-141

TOPIC TAGS: sheet metal forming, sheet metal forming control, coated sheet forming, Sheet metal, metal forming

ABSTRACT: In a search for a method for controlling deformations in sheet metal forming, experimental and theoretical studies were made to determine the effect of various coatings on the temperature distribution on the metal surface. Several

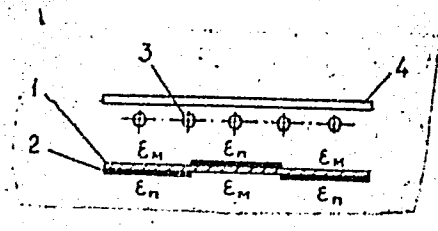


Fig. 1. Applying coating for radiation heating

1 - Sheet blank; 2 - coating; 3 - heat source; 4 - reflector.

Card 1/2 UDC: 621.365.512

ACC NR: AP6036866

coating materials, such as a colloidal graphite suspension in water and molybdenum disulfide, were tested. The coatings were applied to certain parts of the sheet blanks prior to heating and forming. To increase the coefficient of heat absorption up to 5%, soot was added. In the experiments, an OT4 titanium-alloy blank (1.03 mm thick; absorption coefficient 0.45) was coated with a layer of lubricant 0.1—0.3 mm thick having an absorption coefficient of 0.9 (see Fig. 1) and radiation heated. The temperature reached 592C in the center of the blank and 452C on the periphery. The experiments showed that the use of coatings makes it possible to obtain different temperatures on the blank surface, and thus to control the distribution of deformation and improve the quality of formed parts. Orig. art. has: 7 figures and 19 formulas.

SUB CODE: 13/ SUBM DATE: 23Nov65/ ORIG REF: 001/ ATD PRESS: 5108

Card 2/2

ACC NR: AP6022199 SOURCE CODE: UR/0115/66/000/005/0029/0033

AUTHOR: Zernov, I. A.

ORG: none

TITLE: Determining the integral absorption factor in radiation-type heating

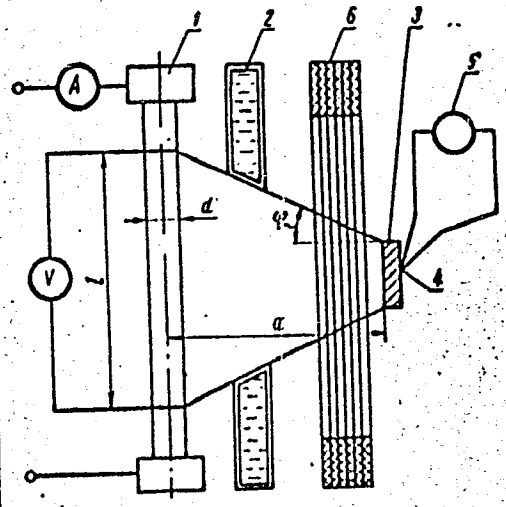
SOURCE: Izmeritel'naya tekhnika, no. 5, 1966, 29-33

TOPIC TAGS: heat transfer, heat absorption, heating engineering

ABSTRACT: A new method of determining the heat-absorption factor under industrial conditions is set forth. The absorption-factor value is determined from a heating curve of the test specimen. The radiators which work in the industrial outfit in question can be used as a source of radiation. Experiments are conducted with larger specific radiation fluxes and at moderate (under 100C) temperatures. A radiation flux from radiator 1 (see figure) passes diaphragm 2 and strikes thermally-insulated sheet specimen 3. Thermocouple 4 and potentiometer 5 measure the specimen temperature. Water-cooled copper diaphragm 2 is so arranged that only the thermal flux from the working segment of rod 1 falls on the specimen. Shield 6 insulates the specimen from

Card 1/2 UDC: 536.3:535.34

ACC NR: AP6022199



the radiator during the latter's heating up to the desirable temperature. By solving a differential equation of specimen heat balance, formulas for the absorption factor and error of measurement are derived. The above method permits determining the absorption factor with an error of 12--16% and requires about 7 min for one reading. Orig. art. has: 2 figures, 21 formulas, and 1 table.

SUB CODE: 13 / SUBM DATE: none / ORIG REF: 005 / OTH REF: 001

Card 2/2

PHASE I BOOK EXPLOITATION SOV/5025

Zernov, Igor' Alekseyevich, and Lev Andreyevich Konorov

Teoreticheskiye osnovy tekhnologii i protsessy izgotovleniya detaley samoletov (Theoretical Basis of the Technology and Manufacturing Processes of Aircraft Parts) Moscow, Oborongiz, 1960. 631 p. Errata slip inserted. 8,000 copies printed. (Series: Tekhnologiya samoletostroyeniya)

Ed. (Title page): D. V. Golyayev, Professor; Reviewers: Khar'kov Aviation Institut and S. S. Bekin, Engineer; Ed.: A. I. Sokolov, Engineer; Ed. of Publishing House: M. F. Bogomolova; Tech. Ed.: V. I. Oreshkina; Managing Ed.: S. D. Krasil'nikov, Engineer.

PURPOSE: This textbook is intended for students at aviation institutes of higher education. It may also be used by engineers and technicians in the aviation industry.

COVERAGE: The book, the first of a 2-volume work, describes general aircraft production methods, including the interchangeability of parts, industrial productivity, production costs, mechanization,

Card 1/13

automation, and standardization. Technological processes in the production of aircraft parts by forging, casting, sheet-metal forming, and from profiles and thin-walled tubing are discussed. The book is used in the course on the theory of aircraft construction given at the Moskovskiy aviatsionnyy institut (Moscow Aviation Institute). Chs. II and VI-VIII of Part I, and Part III were written by L. A. Konorov; Chs. III-V of Part I, and Part II, by I. A. Zernov; Ch. I was written jointly by the authors. The authors thank Professor V. V. Boytsov, Docent I. T. Belyakov, and Candidate of Technical Sciences N. M. Biryukov. There are 13 references, all Soviet.

TABLE OF CONTENTS:

ZERNOV, Igor' Alekseyevich; KONOROV, Lev Andreyevich; BEKIN, S.S., inzh., retsenzent; GOLYAYEV, D.V., prof., red.; SOKOLOV, A.I., inzh., red.; BOGOMOLOVA, M.F., izdat.red.; ORESHKINA, V.I., tekhn.red.

[Theoretical technological fundamentals and processes for manufacturing airplane parts] Teoreticheskie osnovy tekhnologii i protsessy izgotovleniia detalei samoletov. Pod obshchei red. D.V.Goliaeva. Moskva, Gos.nauchno-tekhn.izd-vo Oborongiz, 1960. 631 p. (MIRA 13:12)
(Airplanes--Design and construction)

ZERNOV, I.A., kand. tekhn. nauk.

Selecting the variant of technological process which would garantee the minimum production cost. Trudy MAI no.91:60-105 '57. (MIRA 10:12)
(Engineering--Estimates and costs)

MARKOVSKIY, Yu.M. [deceased]; ZERNOV, K.K.

Hydrobiological Study of the middle Dnieper and a prognosis of the biological cycle in Kremenchug Reservoir. Vop.ikht. no.5:150-162 '55. (MLRA 9:5)

1. Institut gidrobiologii Akademii nauk USSR.
(Dnieper River--Fresh-water biology)

ZEROV, K.K.

Aquatic vegetation in the Kiliya Delta of the Danube River.
Trudy Inst.gidrobiol.AN URSR no.36:37-49 '61. (MIRA 14:8)
(Kiliyskoye Girlo--Fresh-water flora)

VLADIMIROVA, K.S.; ZEROV, K.K.

Physicogeographical survey of limans of the Danube Valley.
Trudy Inst.gidrobiol.AN URSR no.36:185-193 '61. (MIRA 14:8)
(Kiliyskoye Girlo region--Lagoons)

ZEROV, K.K.

Vegetation in limans of the Danube Valley. Trudy Inst.gidrobiol. AN URSR no.36:210-221 '61. (MIRA 14:8)
(Kiliyskoye Girlo region--Fresh-water flora)

ZHERNOV, L.; KUTS, V.

Improve accounting for production and calculation of the cost of products. Bukhg. uchet 15 no.2:23-26 F '58. (MIRA 11:3)
(Costs, Industrial) (Accounting)

ZENOVA, L.P.

Distributing and using working clothes in the southern Kazakhstan Geological Administration. Razved i okh. nedr. 30 no.8:62-63 Ag '64. (MIRA 17:10)

1. TSentral'nyy Komitet professional'nogo soyuza rabochikh geologo-razvedochnykh rabot.

ZERNOV, Lev Semenovich; OSTRINSKAYA, TSetsiliya Romanovna; POSTNIKOVA, Galina Valentinovna; SMIRNOV, N.V., otv. red.; MAZURKEVICH, M., red.izd-va; LEBEDEV, A., tekhn. red.

[Analysis of the managerial operations of enterprises] Analiz khoziaistvennoi deiatel'nosti predpriiatii. Moskva, Gosfinizdat, 1963. 167 p. (MIRA 16:12)
(Finance)

ZERNOV, M.S.

Ichthyofauna of Shapsukho Reservoir. Biul.Inst.biol.vodokhran. no.11:33-36 '61. (MIRA 15:8)

1. Zoologicheskiy institut AN SSSR.
(SHAPSUKHO RESERVOIR--FISHES)

ZERNOV, M. S.

Zernov, M. S. - "Scientific and research activities of the Murmansk Biological Station of the USSR Academy of Sciences during the period from 1939 up to 1946," Trudy Murman. biol. stantsii, Vol. I, 1948, p. 33-38

SO: U-3600, 10 July 53, (Letopis 'Zhurnal 'nykh Statey, No. 6, 1949).

1. ZERNOV, N. F.

2. USSR (600)

4. Lobeline

7. Effect of lobeline and "cytiton" upon respiration in pneumonia in infants, Vop. pediat., 21, no. 1, 1953.

9. Monthly List of Russian Accessions, Library of Congress, April 1953, Uncl.

ZERNOV, N.G., CHUYEVA, L.F.

Symptomatology of patent ductus arteriousus in children and changes following surgery [with summary in English]. Pediatriia 36 no.7:10-16 Je '58 (MIRA 11:7)

1. Iz Instituta gurdnoy khirurgii (dir. - deystvitel'nyy chlen AMN SSSR prof. A.N. Bakulev) AMN SSSR.
(DUCTUS ARTERIOSUS, PATENT, manifest. surgery preop. & postop. sympt. (Rus))

ZERNOV, N.G., kand. med. nauk (Moskva)

Bacterial endarteritis of the patent ductus arteriosus (Botallo's) in children. Khirurgiia no.1:18-23 '63.
(MIRA 17:5)

ZERNOV, N.G.

Study of the blood protein fractions by means of electrophoresis on paper in children and adolescents with congenital heart defects. Vop.okh.mat. i det. 4 no.6:87-88 N-D '59. (MIRA 13:4)

1. Iz Instituta grudnoy khirurgii Akademii meditsinskikh nauk SSSR.
(BLOOD PROTEINS) (PAPER ELECTROPHORESIS)
(HEART--ABNORMITIES AND DEFORMITIES)

ZERNOV, N.G.

Antitoxic function of the liver in children with congenital heart defects. Pediatriia 38 no. 7:70-74 Jl '60. (MIRA 14:1)
(HEART—ABNORMITIES AND DEFORMITIES) (LIVER)

ZERNOV, N.G.; SYUY LE-TYAN' [Hsü Le-t'ien]

Importance of determining arterial pressure in the diagnosis of patent ductus arteriosus in children and adolescents. Grud. khir. 2 no.6:51-55 N-D '60. (MIRA 14:1)

1. Iz otdeleniya zabolevaniy serdtsa i sosudov u detey Instituta grudnoy khirurgii (dir. - prof. S.A.Kolesnikov) nauchnyy rukovoditel' - akademik A.N.Bakulev) AMN SSSR. Adres avtorov: Moskva, Leninskiy prospekt, d.8, Institut grudnoy khirurgii AMN SSSR.
(DUCTUS ARTERIOSUS) (BLOOD PRESSURE)

POLYAKOVA, Ye.N.; ZERNOV, N.G.

Case of serous meningitis and paralysis of the right facial nerve of the peripheral type in acute leukosis. Vop.okh.mat. i det. 7 no.9:89-90 S '62. (MIRA 15:12)

1. Iz 4-go Glavnogo upravleniya pri Ministerstve zdravookhraneniya SSSR (glavnyy pediatr prof. M.N.Kazantseva).
(MENINGITIS) (PARALYSIS,FACIAL)(LEUKEMIA)

ZERNOV, N.G. (Moskva, Sushchevskiy val, d. 14/42, kv. 264)

Differential diagnosis of patent ductus arteriosus in children. Grud. khir. 1. no.2:39-45 Mr-Ap '59. (MIRA 16:5)

1. Iz Instituta grudnoy khirurgii (dir.- prof. A.A.Visalov, nauchnyy rukovoditel' - akademik A.N.Bakulev) AMN SSSR.
(DUCTUS ARTERIOSUS)

ZERNOV, N.G.

Evaluation of the functional state of the cardiovascular system in congenital heart defects. Vop. okh. mat. i det. 7 no.5:72-78 My '62. (MIRA 15:6)

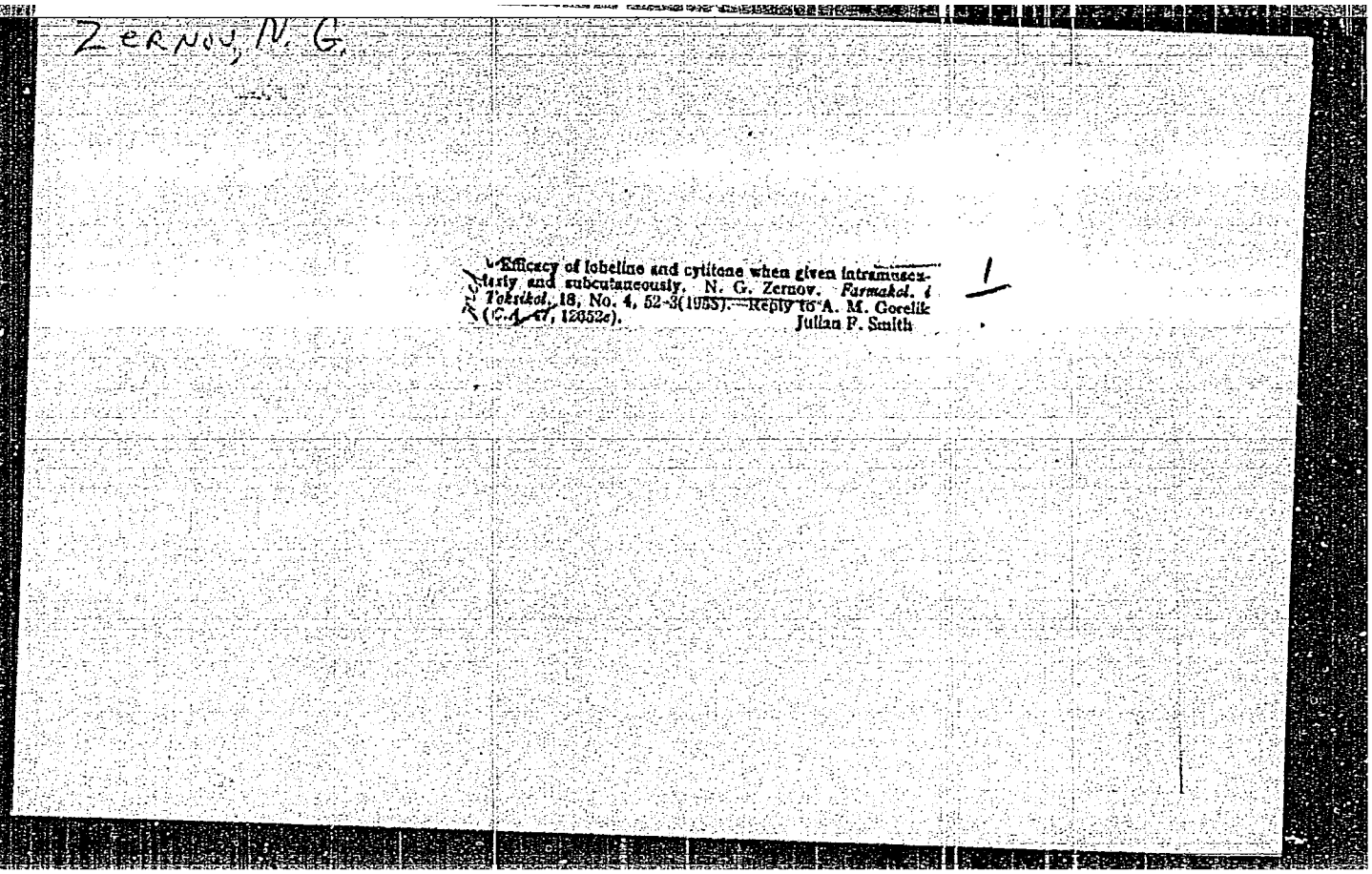
1. Iz TSentral'noy klinicheskoy bol'nitsy 4-go Glavnogo upravleniya pri Ministerstve zdravookhraneniya SSSR (glavnyy pediatr - prof. M.N. Kazantseva).
(HEART--ABNORMITIES AND DEFORMITIES)
(CARDIOVASCULAR SYSTEM)

ZERNOV, N.G.

Basic principles of organizing pedagogic and educational work in a pediatric hospital. Vop. okh. mat. i det. 7 no.2: 78-80 F '62. (MIRA 15:3)

1. Iz 4-go Glavnogo upravleniya pri Ministerstve zdravookhraneniya SSSR (glavnyy pediatr - prof. M.N. Kazantseva).

(PEDIATRICS--STUDY AND TEACHING)



ZERNOV, N. G.

Efficacy of lobeline and cytitone when given intramuscularly and subcutaneously. N. G. Zernov. *Farmakol. i Toksikol.* 18, No. 4, 52-3(1955). Reply to A. M. Gorelik (*C.A.* 47, 12052e). Julian P. Smith

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ZERNOV, N.G.

ZERNOV, N.G.

Effectiveness of lobeline and of cytitone following intramuscular and subcutaneous injections; on A.M.Gorelik's article on the same subject. Farm. i toks. 18 no.4:52-53 Jl-Ag '55 (MLRA 8:11)
(LOBELINE, administration,
intramuscular & subcutaneous)

ZERNOV, N.G., kand.med.nauk

Some data on nitrogen metabolism in congenital heart defects in children and adolescents. Vop.okh.mat.i det. 5 no.4:23-28 Jl-Ag '60. (MIRA 13:7)

1. Iz detskogo otdeleniya Instituta grudnoy khirurgii AMN SSSR (dir. - prof. S.A. Kolesnikov, nauchnyy rukovoditel' - akad. A.N. Bakulev).
(HEART--ABNORMITIES AND DEFORMITIES) (NITROGEN METABOLISM)

ZERNOV, N.G.

Prothrombin-forming function of the liver in congenital diseases of the heart. Grud. khir. 2 no.3:3-8 My-Je '60. (MIRA 15:3)

1. Iz Instituta grudnoy khirurgii AMN SSSR (dir. - prof. A.A. Busalov, nauchnyy rukovoditel' - akademik A.N. Bakulev). Adres avtora: Moskva, Leninskiy prosp., d.8, Institut grudnoy khirurgii AMN SSSR.
(PROTHROMBIN) (HEART--DISEASES) (LIVER)

ZERNOV, N.G., kand.med.nauk

Carbohydrate function of the liver in congenital defects of the heart. Kaz. med. zhur. no.6:11-13 N-D '61. (MIRA 15:2)

1. Institut grudnoy khirurgii AMN SSSR (direktor - prof. S.A.Kolesnikov), nauchnyy rukovoditel' - akademik A.N.Bakulev).
(HEART--ABNORMALITIES AND DEFORMITIES)
(LIVER) (CARBOHYDRATE METABOLISM)

ZERNOV, N.G. (Moskva, A-55, Sushchevskiy val.d,4/42, kv.264)

Functional pathology of the liver in congenital defects of the heart. Report no.1: Functional state of the liver in congenital defects of the heart of the "pale" type. Grud. khir. 2 no.5:28-33 S-) '60. (MIRA 16:5)

1. Iz instituta grudnoy khirurgii AMN SSSR (dir. - prof. S.A. Kolesnikov, nauchnyy rukotovitel' - akademik A.N.Bauklev).
(LIVER) (HEART--ABNORMITIES AND DEFORMITIES)

ZERNOV, N.G., kand. med. nauk

Clinical aspects and diagnosis of isolated stenosis of the pulmonary artery in children. Vop. okhr. mat. i det. 6 no.6: 26-30 Je '61. (MIRA 15:7)

1. Iz 4-go upravleniya pri Ministerstve zdravookhraneniya SSSR (glavnyy pediatr - prof. M.N. Kazantseva).
(ARTERY—DISEASES)

KOLESOV, A.P.; KUTUSHEV, F.Kh.; DAVYDOV, V.P.; YEGOROV, P.I.; ZERNOV, N.P.

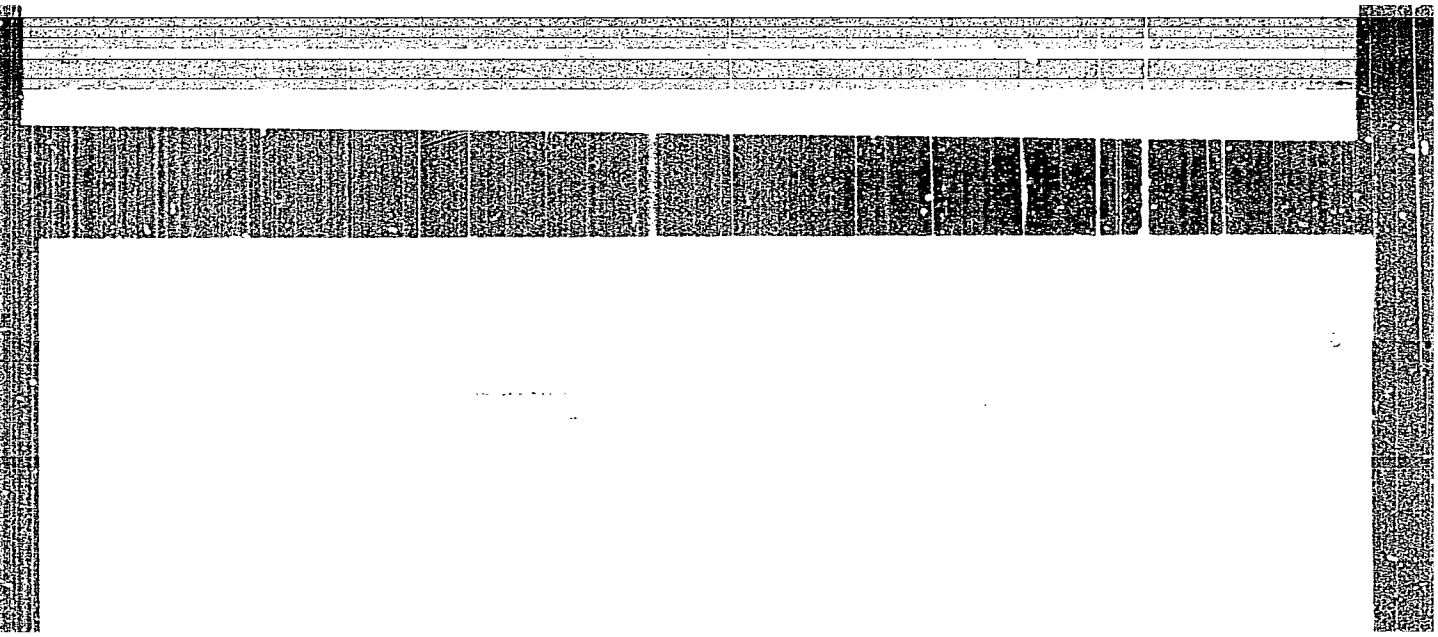
Surgical treatment of bronchiectasis in children [with summary in English, p.160). Vest.khir. no.5:86-94 My '57. (MLRA 10:7)

1. Iz khirurgicheskoy kliniki usovershenstvovaniya vrachey (nach. - prof. P.A.Kupriyanov) i kliniki detskikh bolezney (nach. - prof. M.S. Maslov) Voyenno-meditsinskoy ordena Lenina akademii im. S.M.Kirova. Adres avtorov: Leningrad, 9, pr. K.Marksa, d.7/8, khirurgicheskaya klinika usovershenstvovaniya vrachey.

(BRONCHIECTASIS, in inf. and child surg.)

ZERNOV, N. V.

"Radiation Pattern for a Dielectric Antenna", Radio, No. 3, p 61, 1950.



APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001964510004-1"

ZERNOV, Nikolay Viktorovich, for Doctor of Tech Sci on the basis of dissertation defended 12 Feb 59 in the Council of the Institute of Radio Engineering and Electronics of the Acad. Sci. USSR, entitled: "Theory of wave-band weak- directional ~~antennas for~~ ultra short-(antennas) waves." (MVISSO USSR, 2-61, 16)

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S/109/60/005/012/011/035
E192/E482

9,9000 (also 1127)

AUTHOR: Zernov, N.V.

TITLE: The Electromagnetic Field of a Magnetic Dipole in an Infinite Dielectric Layer With Reflecting Plane

PERIODICAL: Radiotekhnika i elektronika, 1960, Vol.5, No.12, pp.1937-1943

TEXT: The paper considers an infinite dielectric layer above an ideally conducting plane with an elementary magnetic dipole with axis parallel to the reflecting plane. The paper follows Lo (Ref.2). The radiation field is calculated by the method of asymptotic expansion about a point. The calculated radiation patterns show that the presence of a magnetodielectric appreciably changes the field distribution of the spherical wave in space. The field intensity shows a substantial dependence on the parameters of the medium. Calculations for particular cases show that the vertically polarized component of the surface wave is predominant. There are 3 figures and 4 references: 3 Soviet and 1 non-Soviet.

SUBMITTED: March 25, 1960

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ZERNOV, Nikolay Viktorovich; KARPOV, Veniamin Grigor'yevich; KRYLOV, N.N., retsenzent; KAZAKNOVSKIY, D.M., nauchn. red.; PAVLOVA, L.S., red.

[Theory of radio circuits] Teoriia radiotekhnicheskikh tsepei. Moskva, Energiia, 1965. 891 p. (MIRA 18:5)

PEREL'SHTEYN, Naum L'vovich; KOBLIKOV, M.P., red.; ZERNOV, P.M., otv. za vypusk; SUKHAREVA, R.A., tekhn.red.

[Using prestressed reinforced concrete in construction] Predvaritel'no napriazhennyi zhelezobeton v stroitel'stve. Moskva, Ob-vo po rasprostraneniiu polit. i nauchn.znanii RSFSR, 1959. 41 p. (Moskovskii dom nauchno-tekhnicheskoi propagandy. Peredovoi opyt proizvodstva. Seriia: Stroitel'stvo, no.4). (MIRA 13:6)

(Prestressed concrete)

ZERNOV, P.M.

Prospects for raising technological standards in constructing electric transmission lines; from the report by P.M.Zernov, Deputy Minister of Communications of the U.S.S.R. at the session of the section of construction for the transportation industry of the All-Union Conference on Building. Transp. stroi. 8 no. 5:9-11 My '58. (MIRA 11:7)

1. Zamestitel' ministra svyazi SSSR.
(Electric lines--Underground)
(Excavating machinery)

ZERNOV, P.M.

Build better, faster, and cheaper. Vest. sviazi 18 no. 8:1-2 Ag '58. (MIRA 11:8)

1. Zamestitel' ministra svyazi SSSR.
(Telecommunication)
(Building)

ZERNOV, P.M.
p. 3

19(8) SOV/111-59-6-6/32

AUTHOR: None given

TITLE: The Construction of Communication Equipment - on the Level of New Goals

PERIODICAL: Vestnik svyazi, 1959, Nr 6, pp 1-4 (USSR)

ABSTRACT: The article presents information on an all-Union conference of construction specialists of the USSR Ministry of Communications, which was convened in Moscow. Two reports were heard with a discussion following them. The first report was delivered by N.D. Psurtsev, the USSR Minister of Communications, on "Principles of the Development of Communication Means for 1959 - 1965, and Goals for Fulfilling the Plan of the Construction of Communication Equipment for 1959, and the Further Increase in the Technical Level of the Construction of Communication Equipment". In this report, Psurtsev pointed out that the capital investment into the construction of communication equipment will be doubled during the 1959 - 1965 period as com-

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pared with the past 7-year period. The podryadnyye tresty (contractor trusts) will do 22% more construction in 1959 than they did in 1958. The mechanization of construction is insufficient for the planned amount of work, and measures are being taken to provide for construction equipment and for automobile-transport means of very high capacity. The workshops of the contractor trusts will have to produce more "small" means of mechanization. Permanent local construction-and-assembly units "GTS" are being organized to provide for a stable labor force and for a base for the construction of urban telephone networks. The mechanization of radiofication and "telephonization" work, carried out by SMUR and SMURCh, will be increased from 5 to 60% in the construction of overhead radiofication and "VRS" (intra-area communications) lines, and up to 80% in the construction of cable lines. Also, the production and the use of reinforced concrete masts should be promoted. To bring the project development work nearer

to the construction sites, branch project institutes were organized during 1958 in some Soviet republics, e.g. in Tashkent, Tbilisi; the branch institute in Kiyev was expanded; a branch institute is planned for Novosibirsk in 1959. The standard projects have raised the technical level of construction, and are being further improved along with the modernization of equipment, production of new parts and their standardization. Nevertheless, the costs of the projects are still too high, and there are cases of defective projects and, especially often, of inaccurate costs estimates. The cooperation between the local project institutes and the scientific research institutes of the Ministry of Communications is lagging and will have to be improved. The second report was delivered by Zernov, P.M., the USSR Deputy Minister of Communications, on "The Results of the Fulfilled Plan of the Investment Building for 1958, and the Goals for Further Industrialization and Mechanization of Communication Objects".

The Construction of Communication Equipment - on the Level of New Goals

Zernov reviewed the achievements in investment building during the year 1958 and stressed that a number of construction organizations did not reduce the costs of construction-and-assembly work as planned, e.g. the trest "Radiostroy" (Trust "Radiostroy"). He pointed out that the planning of construction objects is not always accompanied with sufficient funds. The building investment plan for 1959 calls for an increase in construction activity of 16.5% as compared with the work volume accomplished in 1958. To achieve this, the building machinery pools will be increased and modernized; the Novosibirskaya and the L'vovskaya Baza (Novosibirsk and L'vov Bases) will be expanded, and a number of new bases will be established. The trusts will conduct an on-the-job training of 1,100 workers, and will improve the qualifications of an additional 1,020 workers; 86 engineers and 63 technicians will be assigned from among the graduates of special educational institutions. In the discussion following both re-

The Construction of Communication Equipment - on the Level of New Goals

ports, the operational and organizational conditions existing in the communication-construction industry were reviewed and criticized. The following persons took part in the discussion: Shmelev, Administrator of the trest "Mezhgorsvyaz'stroy" (Trust "Mezhgorsvyaz'stroy"); Turovskiy, Manager of a Main Cable Line; Lebedev, Worker of SMU-4; Yakovlev, Worker of a Main Cable Line; Anosovich, Manager of TsNIIS; Novikov, Head of Giprosvyaz'; Nogtev, Administrator of the Trust "Radiostroy"; Fortushenko, Head of NII of the USSR Ministry of Communications; Stoyanov, Head of the Proyektnyy institut Ministerstva svyazi SSSR (Planning Institute of the USSR Ministry of Communications) (GSPI); Alychenkov, Senior Work Superintendent of the Trust "Radiostroy"; Ministers of Communications of the following republics: Afanas'yev - Belorusskaya, Sharkov - Uzbekskaya, Noskov - Kazakhskaya, Tsivun - Ukrainskaya, and Kavtaradze - Gruzinskaya; Kogan, Worker of the Kuybyshevskaya DRSV (Kuybyshev

The Construction of Communication Equipment - on the Level of New Goals

DRSV); Tugushi, Manager of the trest "Soyuztelefonstroy" (Trust "Soyuztelefonstroy"); Korenev, Manager of the trest "Mostelefonstroy" (Trust "Mostelefonstroy"); Kalmykov, Welding-Team Leader of the Trust "Mostelefonstroy"; Semenkov, Head of the Glavnoye upravleniye snabzheniya Ministerstva svyazi SSSR (Main Administration of Procurement of the USSR Ministry of Communications); Seval'nev, Head of the Glavnoye upravleniye kapital'nogo stroitel'stva Ministerstva svyazi SSSR (Main Administration of Capital Investments of the USSR Ministry of Communications); Zelengurov, Administrator of the Voronezh SMUR; Petrushin, Chief Engineer of the GUMTTS; Yarchevskaya, Chief Engineer of the Trust "Mezhgorsvyaz'stroy"; and others, altogether more than 30 persons. There is one photo.

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BAROCHINA, B.Ya.; KATUSHKIN, V.P.; MINSTER, V.Sh.; ABOVSKIY, B.TS.; ALEKSANDROVICH, I.F.; ZERNOV, P.N.; SORINA, Ye.M.; DOLGOVA, I.M.; POZIN, Z.S.; SMYKOV, B.A.

Recovery of carbon disulfide from the steam-air mixture from centrifugal machines. Khim. volok. no.4:69-70, '64. (MIRA 18:4)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut iskusstvennogo volokna (for Barochina, Katushkin, Minster). 2. Mogilevskiy zavod iskusstvennogo volokna (for all except Barochina, Katushkin, Minster).

ZERNOV, P. N.

Mogilev Factory striving for the improvement of production.
Khim. volok. no.6:47-49 '62. (MIRA 16:1)

(Mogilev--Textile fibers, Synthetic)

ZERNOV, P.N.; CHERNOVA, N.M.; BURENKOVA, L.F.

Spinning of silk at variable speed. Khim.volok. no.4:72-74 '60.
(MIRA 13:10)

1. Mogilevskiy zavod.
(Rayon spinning)

ZERNOV, S., inzh.

Depth of the single water system of the European U.S.S.R. Rech. transp. 21 no.5:32-34 My '62. (MIRA 15:5)
(Inland navigation)